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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/824,631	04/14/2004	Fabio Pellizzer	854163.414	6272

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EXAMINER

NGUYEN, JOSEPH H

ART UNIT PAPER NUMBER

2815

DATE MAILED: 08/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

(2)

<b>Office Action Summary</b>	<b>Application No.</b> 10/824,631	<b>Applicant(s)</b> PELLIZZER, FABIO	
	<b>Examiner</b> Joseph Nguyen	<b>Art Unit</b> 2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 June 2005.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 1-9 and 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 10-17 and 19-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>8/25/04</u> . | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Election/Restrictions***

Applicant's election of claims 10-26 in the reply filed on 06/23/2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)). Further, claim 18, which depends from non-elected claim 1, is also withdrawn from consideration.

### ***Specification***

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the limitation "first resistive element; second resistive element; delimiting structure with an aperture having first portion over first resistive element and second portion over second resistive element" of claim 24 is not defined in the disclosure.

### ***Claim Objections***

Claim 24 is objected to because of the following informalities: delete "first resistive element" and "second resistive element" in lines 4-5 of claim 24 and insert "the first resistive element" and "the second resistive element"; delete "first portion of said

aperture" and "second portion of said aperture" in lines 6-7 and 9-10 and insert "the first portion of said aperture" and "the second portion of said aperture".

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 recites the limitation "said first direction" in line 3. There is insufficient antecedent basis for this limitation in the claim. "First direction" was not previously referred to in claim 10 from which claim 17 depends.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 10-12, 14-15 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Zahorik et al. (US 6,316,784)

Regarding claim 10, Zahorik et al. discloses in figure 16 a phase change memory cell, comprising: a resistive element 120 (col. 8, line 40); a delimiting structure 80 (col.7, line 37), having an aperture over said resistive element; and a memory portion of a phase change material 130(col. 8, line 44), housed in said aperture; said resistive element and said memory portion being in direct electrical contact and defining a contact area of sub lithographic extension; wherein said memory portion is sealed inside said aperture by a sealing structure 170,180 (col.9, lines 65-66 and col.10, lines 2-3) directly lying on said delimiting structure.

Note that element 120 is formed of TiN or carbon, which has a resistance property and therefore can function as a resistive element.

Regarding claim 11, Zahorik et al. discloses in figure 16 said delimiting structure 80 comprises at least a dielectric layer (col. 7, line 37).

Regarding claim 12, Zahorik et al. discloses in figure 16 said sealing structure 170, 180 lies directly on said dielectric layer 80.

Regarding claim 14, Zahorik et al. discloses in figure 16 said memory portion 130 is aligned with said delimiting structure.

Regarding claim 15, Zahorik et al. discloses in figure 16 said sealing structure comprises a stack of conducting layers 170, 180.

Regarding claim 19, Zahorik et al. discloses the aperture is a slit. See figure 2 as part of manufacturing process of the structure shown in figure 16.

Claims 10-11, 13, 16-17, 19 and 24-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Lowrey (US 2003/0047762 A1).

Regarding claim 10, Lowrey discloses in figure 2 a phase change memory cell, comprising: a resistive element 14 (para [0021], line 3); a delimiting structure 16, 26 (para [0021], line 5 and para [0029], line 3), having an aperture over said resistive element; and a memory portion of a phase change material 18(para [0021], line 8), housed in said aperture; said resistive element and said memory portion being in direct electrical contact and defining a contact area of sub lithographic extension; wherein said memory portion is sealed inside said aperture by a sealing structure 28 (para [0021], line 7) directly lying on said delimiting structure.

Note that although the material of element 14 is not known, it is inherent that every material has a certain resistance property and that element 14 can function as a resistive element.

Regarding claim 11, Lowrey discloses in figure 2 said delimiting structure comprises at least a dielectric layer 16 (para [0021], line 5).

Regarding claim 13, Lowrey discloses in figure 2 said delimiting structure comprises adhesion portion 26 interposed between said dielectric layer 16 and said sealing structure 28. Note that element 26 is formed of Ti (para [0029], line 3), which is the same material being used for adhesion layer 28 of the instant application (page 7, line 4). Therefore, element 26 can function as adhesion layer.

Regarding claim 16, Lowrey discloses in figure 2 said resistive element 14 includes a first thin portion (any portion of element 14 can be a thin portion since the

term" thin portion" is a broad limitation) having a first sub lithographic dimension in a first direction (i.e. direction in X axis) and said memory portion 18 has a second sub lithographic dimension in a second direction (i.e. direction in Y axis) traverse to said first direction; said contact area of sub lithographic extension having substantially said first sub lithographic dimension in said first direction and said second sub lithographic dimension in said second direction.

Regarding claim 17, as best understood, Lowrey discloses in figure 2 said memory portion 18 has a substantially elongated shape with a main dimension extending parallel to said first direction.

Regarding claim 19, Lowrey discloses in figure 5 (manufacturing process of the structure shown in figure 2) said aperture is a slit.

Regarding claim 24, Lowrey discloses in figure 2 a memory device comprising first resistive element 14 (element 14 on the right hand side portion of figure 2); second resistive element (element 14 on the left hand side portion of figure 2); delimiting structure 16, 26 with an aperture having first portion over the first resistive element and second portion over the second resistive element; first memory portion of phase change material 18 in the first portion of said aperture, the first resistive element and first memory portion together forming a first memory element, and second memory portion of phase change material (element 18 on the left hand side portion of figure 2) in the second portion of said aperture, the second resistive element and second memory portion together forming a second memory element.

Regarding claim 25, Lowrey discloses in figure 2 said first and second memory portions are sealed inside said aperture by sealing structure 28 directly lying on said delimiting structure 16, 26.

Regarding claim 26, Lowrey discloses in figure 5 (manufacturing process of the structure shown in figure 2) said aperture is a slit.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zahorik et al. in view of the acknowledged prior art (APA) in page 2, lines 25-28 of the instant application.

Regarding claim 20, Zahorik et al. discloses in figure 16 substantially all the structure set forth in claim 20 (see rejection of claim 10) except a selection element. However, applicant admitted it is well known in the art to associate a selection element with a phase change memory (page 2, lines 25-28 of the instant application). In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zahorik et al. by having a selection element associated with a phase change memory to prevent noise (page 2, line 26 of the instant application).



Regarding claims 21 and 22, applicant disclosed in page 2, lines 27-28 the selection element is a transistor or a diode.

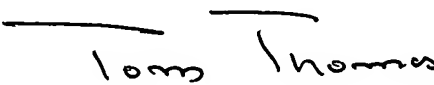
Regarding claim 23, Zahorik et al. discloses the aperture is a slit.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JN  
August 10, 2005

  
**TOM THOMAS**  
**SUPERVISORY PATENT EXAMINER**